Amendments to the Claims

1.   (Currently Amended) A method of transcoding video from a source format to a target format at a lower bitrate, the method comprising:

obtaining type values for plural units of compressed video in the source format;

decompressing the compressed video in the source format; and

re-compressing the video to produce compressed video in the target format, including making first coding decisions during the re-compressing based at least in part on the obtained type values to help match quality between the respective compressed video in the target and source formats, and further including independently making second coding decisions to make use of compression efficiencies of the target format to reduce bitrate, wherein the source format is different than the target format, the source format using plural source format syntax elements indicating the obtained type values, and the target format using plural target format syntax elements instead of the plural source format syntax elements, wherein the independently making the second coding decisions includes:

using intensity compensation to scale and/or shift values in a reference picture; and

performing motion estimation to compute plural new motion vectors to be used in motion compensation, each of the plural new motion vectors referencing the reference picture, wherein, for at least one of the plural new motion vectors, use of motion vector information from the compressed video in the source format speeds up the motion estimation by guiding searching in a motion estimation search area.

2.   (Original) The method of claim 1 wherein obtaining the type values comprises parsing the compressed video in the source format.

3.   (Cancelled)

4.   (Currently Amended) The method of claim [[3]] 1 wherein the motion estimation and compensation use independently making the second coding decisions further includes performing loop filtering on the reference picture and intensity compensation.

5.   (Currently Amended) The method of claim [[3]] 1 wherein the motion estimation
and compensation use up to four motion vectors per macroblock and quarter-pixel motion vector
precision.

6.   (Original) The method of claim 1 wherein independently making second coding
decisions includes selecting size of a variable-size frequency transform.

7.   (Original) The method of claim 1 wherein independently making second coding
decisions includes selecting prediction modes for motion vectors or prediction residuals.

8.   (Original) The method of claim 1 wherein the decompressing comprises fully
decompressing the compressed video.

9.   (Original) The method of claim 1 wherein compression in the source format and
compression in the target format use different frequency transforms.

10.   (Original) The method of claim 1 wherein compression in the source format and
compression in the target format use different entropy encoding.

11.   (Cancelled)

12.   (Original) The method of claim 1 wherein the plural units are video pictures, and
wherein the type values are picture type values that include I picture, P picture, and B picture.

13.   (Original) The method of claim 1 wherein the bitrate of the compressed video in
the target format is equal or below bitrate of the compressed video in the source format on a
picture-by-picture basis for substantially all of the one or more video pictures.

14.   (Original) The method of claim 1 wherein the plural units are macroblocks, and
wherein the plural type values are macroblock coding type values.

15.   (Original) The method of claim 14 wherein the macroblocks include an intra coded macroblock and an inter coded macroblock, and wherein the macroblock coding type values include intra and inter.

16.   (Original) The method of claim 1 wherein the source format is an MPEG-2 format, and wherein the target format is a WMV9 format.

17.   (Currently Amended) A method of transcoding video from a first format to a second format at a lower bitrate, the method comprising:

obtaining picture type values for plural pictures of compressed video in the first format;

fully decompressing the compressed video in the first format; and

re-compressing the video to produce compressed video in the second format, including making picture type decisions during the re-compressing based at least in part on the obtained picture type values, and further including performing motion estimation and compensation to make use of compression efficiencies of the second format to reduce bitrate, wherein the first format is different than the second format, the first format using plural first format syntax elements indicating the obtained picture type values, and the second format using plural second format syntax elements instead of the plural first format syntax elements, wherein the re-compressing the video includes performing intensity compensation to scale and/or shift values in a reference picture, and wherein for each of plural new motion vectors the motion estimation uses motion vector information from the compressed video in the first format to speed up searching for the new motion vector in a motion estimation search area.

18.   (Currently Amended) The method of claim 17 wherein the motion estimation and compensation in the second format differs from motion estimation and compensation in [[to]] the first format in terms of due to use of loop filtering on the reference picture, number of motion vectors per macroblock, use of intensity compensation, and/or motion vector precision.

19.   (Original) The method of claim 17 wherein the first format and the second format use different frequency transforms.

20.   (Cancelled)

21.   (Original) The method of claim 17 wherein the picture type values include I picture, P picture, and B picture.

22.   (Original) The method of claim 17 wherein the re-compressing includes using the picture type values to match one or more picture positions between the compressed video in the first format and the compressed video in the second format.

23.   (Original) The method of claim 17 wherein the re-compressing includes using the picture type values to match group of picture structure between the compressed video in the first format and the compressed video in the second format.

24.   (Currently Amended) A method of transcoding video comprising:

obtaining frame/field information for compressed video in a first format;

fully decompressing the compressed video in the first format; and

re-compressing the video to produce compressed video in a second format different than the first format, including making coding decisions during re-compressing based at least in part on the obtained frame/field information to help match the quality of the compressed video in the second format to the quality of the compressed video in the first format, wherein the first format is different than the second format, the first format using plural first format syntax elements indicating the obtained frame/field information, and the second format using plural second format syntax elements instead of the plural first format syntax elements, and wherein the making the coding decisions during the re-compressing further includes:

using intensity compensation to scale and/or shift values in a reference picture; and

performing motion estimation to compute plural new motion vectors to be used in motion compensation, each of the plural new motion vectors referencing the reference picture, wherein, for at least one of the plural new motion vectors, use of motion vector information from the compressed video in the source format speeds up the motion estimation by guiding searching in a motion estimation search area.

25.   (Original) The method of claim 24 wherein the re-compressing includes setting field/frame types at macroblock level in the compressed video in the second format.

26.   (Original) The method of claim 24 wherein the re-compressing includes setting field/frame types at picture layer in the compressed video in the second format.

27.   (Original) The method of claim 24 wherein the compressed video in the second format has a bitrate lower than the bitrate of the compressed video in the first format.

28.   (Original) The method of claim 24 wherein the re-compressing includes performing motion estimation and compensation to make use of compression efficiencies of the second format to reduce bitrate.

29.   (Cancelled)

30.   (Currently Amended) A method of transcoding video comprising:
obtaining quantization levels for compressed video in a first format;
decompressing the compressed video in the first format; and
re-compressing the video to produce compressed video in a second format, including setting quantization levels for the compressed video in the second format based at least in part on the obtained quantization levels and performing motion estimation to generate plural new motion vectors by, for each of the plural new motion vectors, using motion vector information from the compressed video in the first format to guide searching in a motion estimation search area, wherein compression in the first format and compression in the second format use different frequency transforms, and wherein the first format is different than the second format, the first format using plural first format syntax elements indicating the obtained quantization levels, and the second format using plural second format syntax elements instead of the plural first format syntax elements and wherein the re-compressing further includes using intensity compensation to scale and/or shift values in one or more reference pictures used with the plural new motion vectors.

31.   (Original) The method of claim 30 wherein compression in the first format uses a DCT and compression in the second format uses a fast integer transform.

32.   (Cancelled)

33.   (Original) The method of claim 30 wherein the obtained quantization levels are for macroblocks of the compressed video in the first format.

34.   (Original) The method of claim 30 wherein the re-compressing comprises setting a quantization level for a video picture of the compressed video in the second format based at least in part upon an average of the obtained quantization levels.

35.   (Original) The method of claim 30 wherein the re-compressing comprises setting a quantization level for a macroblock of the compressed video in the second format based at least in part upon one of the obtained quantization levels.

36.   (Original) The method of claim 30 further comprising adjusting the obtained quantization levels for rate control before applying the quantization levels.

37.   (Original) The method of claim 30 wherein considering the obtained quantization levels helps match the quality of the compressed video in the second format to the quality of the compressed video in the first format.

38.   (Currently Amended) A method of transcoding video comprising:
        obtaining per-macroblock quantization levels for plural macroblocks of compressed video in a first format;
        decompressing the compressed video in the first format; and
        re-compressing the video to produce compressed video in a second format, including setting quantization levels for corresponding macroblocks of the compressed video in the second format based at least in part on the obtained quantization levels and performing motion estimation to generate plural new motion vectors by, for each of the plural new motion vectors, using motion vector information from the compressed video in the first format to guide searching

in a motion estimation search area, and wherein the first format is different than the second format, the first format using plural first format syntax elements indicating the obtained quantization levels, and the second format using plural second format syntax elements instead of the plural first format syntax elements and wherein the re-compressing further includes using intensity compensation to scale and/or shift values in one or more reference pictures used with the plural new motion vectors.

39.   (Cancelled)

40.   (Original) The method of claim 38 wherein the second format uses differential quantization level signaling at the macroblock layer.

41.   (Original) The method of claim 38 wherein the quantization levels are quantization step sizes.

42.   (Original) The method of claim 38 further comprising adjusting the obtained quantization levels for rate control before applying the quantization levels.

43.   (Currently Amended) A method of transcoding video comprising:
        obtaining quantization levels for compressed video in a first format;
        decompressing the compressed video in the first format; and
        re-compressing the video to produce compressed video in a second format, including quantizing the compressed video in the second format to a degree comparable to the obtained quantization levels to reduce differences in quality between the respective compressed video in the first and second formats and performing motion estimation to generate plural new motion vectors by, for each of the plural new motion vectors, using motion vector information from the compressed video in the first format to guide searching in a motion estimation search area, wherein compression efficiencies of the second format substantially reduce bitrate of the compressed video in the second format compared to the compressed video in the first format, and wherein the first format is different than the second format, the first format using plural first format syntax elements indicating the obtained quantization levels, and the second format using plural second format syntax elements instead of the plural first format syntax elements, and

<u>wherein the re-compressing uses intensity compensation to scale and/or shift values in one or more reference pictures used by the plural new motion vectors created during the motion estimation.</u>

44.   (Original) The method of claim 43 including tracking quantization or bitrate at the picture level for the respective compressed video in the first and second formats.

45.   (Original) The method of claim 43 including tracking quantization or bitrate at the macroblock level for the respective compressed video in the first and second formats.

46.   (Original) The method of claim 43 wherein the compression efficiencies of the second format reduce bitrate of the compressed video in the second format by at least 20% compared to the compressed video in the first format.

47.   (Original) The method of claim 43 wherein overall differences in quality between the compressed video in the second format and the compressed video in the first format are below visibility thresholds.

48.   (Currently Amended) The method of claim 43 wherein motion estimation and compensation in the second format differ from motion estimation and compensation in [[to]] the first format in terms of use of loop filtering <u>on the one or more reference pictures</u>, number of motion vectors per macroblock, ~~use of intensity compensation,~~ and/or motion vector precision.

49.   (Original) The method of claim 43 wherein compression in the second format uses a variable-size frequency transform.

50.   (Original) The method of claim 43 wherein compression in the second format and compression in the first format use different prediction modes for motion vectors and/or prediction residuals.

51.   (Original) The method of claim 43 wherein compression in the second format and compression in the first format use different entropy encoding.

52.   (Cancelled)

53.   (Currently Amended) A method of transcoding video comprising:

decompressing compressed video in a first format; and

re-compressing the video to produce compressed video in a second format using a second

format encoder with default one-pass variable bitrate encoding, including regulating compression

parameters of the second format encoder to produce the compressed video in the second format

at a constant or relatively constant bitrate by varying quality and bitrate in proportion to one or

more rate control criteria and performing motion estimation to generate plural new motion

vectors by, for each of the plural new motion vectors, using motion vector information from the

compressed video in the first format to guide searching in a motion estimation search area, and

wherein the first format is different than the second format, the first format using plural first

format syntax elements, and the second format using plural second format syntax elements

instead of the plural first format syntax elements and wherein the re-compressing further

includes using intensity compensation to scale and/or shift values in one or more reference

pictures used with the plural new motion vectors.

54.   (Original) The method of claim 53 wherein the one or more rate control criteria

are based at least in part on buffer fullness values.

55.   (Original) The method of claim 53 wherein the one or more rate control criteria

are based at least in part on deviations between allocated bits and used bits for previous video.

56.   (Cancelled)